Amendments to the Specification:

Please replace claim 20 as follows:

[0020] The heat balances per unit of depth are as follows :

- Heat supplied by the medium surrounding the well to the fluid in the annulus :

$$Q_1 = \frac{2\Pi\lambda_f}{\ln\left(\frac{R_t}{R_f}\right)}(\theta_2 - \theta_f)$$

- ~~annulus:~~

- Heat carried from the fluid in the annulus to the fluid within the drill string :

- Heat accumulated by the fluid in the drill string and in the annulus :

$Q_t = -D.\rho.C_p\Delta\theta_1$

$$Q_2 = \frac{2\Pi\lambda_a}{\ln\left(\frac{R_2}{R_1}\right)}(\theta_1 - \theta_2)$$

$Q_a = D.\rho.C_p\Delta\theta_2$.

Please replace paragraph 26 as follows:

[0026] According to the invention, these curve forms are adjusted to the

$$\theta_1(z) = -K_1 B e^{r1.z} - K_2 B e^{r2.z} + \theta_f - \frac{\alpha}{B}$$
$$\theta_2(z) = -K_3 (B + r_1) e^{r1.z} - K_4 (B + r_2) e^{r2.z} + \theta_f.$$

three measuring points of the drilling fluid temperature at the inlet, T1, at the well bottom, T2, and at the well outlet, T3. In order to use these three measuring points as boundary conditions, the two equations (in the drill string and in the annulus) are decoupled by using different integration constants while keeping the general expression. Two general expressions of the temperature profile are obtained in the drill string, θ1, and in the annulus, θ2, which have a physical significance but which comprise two degrees of freedom. Thus, expressions θ1 and θ2 can be adjusted by fixing the degrees of freedom in order to meet the temperature conditions T1, T2 and T3. Therefore the equations in the pipes and in the annulus have the form as follows :

$$\theta_1(z) = -K_1 B e^{r1.z} - K_2 B e^{r2.z} + \theta_f - \frac{\alpha}{B}$$
$$\theta_2(z) = -K_3 (B + r_1) e^{r1.z} - K_4 (B + r_2) e^{r2.z} + \theta_f.$$